

What is claimed is:

1. A liquid crystal display comprising:

a liquid crystal panel having a large number of picture elements arranged at intersections of plural selection lines and data lines;

5 a selection line signal output IC for outputting a selection line signal to the selection lines of said liquid crystal panel;

a signal line drive IC for outputting an image write voltage and a black write voltage to the data line of said liquid crystal panel; and

10 a reference voltage generator circuit, which is arranged so as to generate a reference voltage including an image display voltage for outputting an image write voltage and a black display voltage for outputting a black write voltage, switches over the reference voltage either to said image display voltage or to said black display voltage, and supplies said reference voltage to said signal line drive IC;

wherein switching said reference voltage is performed so that an image display period for supplying said image display voltage and a black display period for supplying the black display voltage are contained in one horizontal period, and the switching the reference voltage is synchronized with change in selection line signals of lines in which an image of said selection line is written and lines in which black is written.

25 2. The liquid crystal display according to claim 1, wherein when said selection line signal output IC drives  $nG$  selection lines and a selection line clock period  $TH$  is used for driving said selection lines, a signal, which makes the output of said selection line signal output IC valid when said reference voltage is switched to the image display voltage while making the output of said selection line signal

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output IC invalid when said reference voltage is switched to the black display voltage, is inputted to said election signal output IC during nGTH period from input of a start pulse, and an inverted signal of said signal is inputted after the nGTH period.

5           3. The liquid crystal display according to claim 1, wherein said reference voltage is switched from the black display voltage to the image display voltage at time T1 and switched from the image display voltage to the black display voltage at time T2, said selection line signal output IC outputs the selection line signals so that  
10 the lines of the selection lines selected at time  $(T2-T1)/2$  are changed to a non-selective state at a time later than  $(T2-T1)/2$  and earlier than T2.

          4. The liquid crystal display according to claim 1, wherein said reference voltage is switched in a horizontal blanking period  
15 during which no image data is loaded in said signal line drive IC.

          5. The liquid crystal display according to claim 1, wherein said reference voltage is switched during a period when image data are loaded in said signal line drive IC.

          6. A liquid crystal display comprising:  
20 a liquid crystal panel having a large number of picture elements arranged at intersections of plural selection lines and data lines;  
a selection line signal output IC for outputting a selection line signal to the selection lines of said liquid crystal panel;  
a signal line drive IC for outputting an image write voltage  
25 and a black write voltage to the data line of said liquid crystal panel; and

a reference voltage generator circuit, which is arranged so as to generate reference voltage including an image display voltage used for outputting said image write voltage and a black display  
30 voltage used for outputting said black write voltage, switches to

either a first reference voltage generation mode in which the black display voltage is generated under positive polarity and the image display voltage is generated under negative polarity or a second reference voltage generation mode in which the black display voltage is generated under negative polarity and the image display voltage is generated under positive polarity, and supplies the reference voltage generated in said changed reference voltage generation mode to said signal line drive IC, wherein:

said first reference voltage generation mode and said second reference voltage generation mode alternate every vertical period so that said image write voltage or said black write voltage is outputted to said picture elements during one vertical period.

7. The liquid crystal display according to claim 1, wherein said reference voltage generator circuit is comprised of resistors connected in series, and said resistance values are changed by switching elements connected in series or in parallel to said resistors.

8. The liquid crystal display according to claim 1, wherein said reference voltage generator circuit is comprised of a semiconductor device capable of inputting a digital signal, and a voltage of an arbitrary value is generated conforming to said digital signal.

9. The liquid crystal display according to claim 1, wherein said reference voltage generator circuit has an analog switch for switching the voltage from said image display voltage to said black display voltage or from said black display voltage to said image display voltage.

10. The liquid crystal display according to claim 1, wherein an absolute value of the black display voltage generated by said reference voltage generator circuit is lower than an absolute value

of the black voltage of the image display voltage under the condition of normally black liquid crystal and is higher than said absolute value under the condition of normally white liquid crystal.

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